Put Together Regional Powers to Realize Disaster Mitigation!

DISASTER MITIGATION RESEARCH CENTER

Creating models to realize disaster mitigation by deepening many types of cooperation in the whole region based on advanced disaster mitigation research.

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Message for the Foundation of Disaster Mitigation Research Center

Disaster Mitigation Research Center was founded in December 2010 in order to drastically mitigate damage caused by great earthquakes along the Nankai Trough and wind & flood that may accompany possible climate warming. As well as promoting the advanced research on disaster mitigation for more than a year, concurrent professors, who belong to four graduate schools of environmental, life sciences, and education and human development, have been dedicated to the creation of disaster mitigation models by deepening cooperation between different research fields, between universities in different regions, and with various disaster prevention providers such as industrial circles, non-government, and citizens groups. The Great East Japan Earthquake occurred on March 11, 2011, just after the Center started its activities in preparation for similar disasters. The Center Foundation Memory Symposium, originally scheduled for March 26, 2011 was restructured as a disaster memorial symposium, where everyone tried to share the extent of the damage known at that point. At the same time, the Center opened a clearinghouse called Mega-Disaster Information Center “MeDIC” for information sharing purpose. After the Earthquake, the “Urgent Proposal Council concerning the Enhanced Promotion of Measures against Earthquake Disasters in Nagoya,” which is represented mainly by professors at the Center, put together its proposals in a report entitled “Urgent Proposal – Protect People and Towns in Nagoya from Looming Earthquakes along the Nankai Trough.” At a disaster prevention conference in Nagoya on June 14, 2011, (then) previous Director of the Center Ryochi Fuji handed the report to Nagoya Mayor Takashi Kawamura. The Center since then has involved in the preparation of disaster prevention strategies and the survey on damage prediction in cooperation with Aichi Prefecture and Nagoya City. In June 2011 or later, the Center set up two divisions: Social Cooperation Division and Research Cooperation Division. Social Cooperation Division set up Social Cooperation Promotion Council, invites outside professionals who are playing active roles in industry-government-academic-private sectors, discussing what future disaster mitigation cooperation should be like. This division will also serve as a promotion organization for regional collaboration. In April 2012, three endorsed research divisions were set up within Social Cooperation Division, starting their activities as headquarters of full-scale cooperative research with the industry sector. On the other hand, Research Cooperation Division allocates professors to four research fields that constitute basics of disaster mitigation research, moving forward with advanced research jointly with 32 concurrent professors belonging to graduate schools of environmentology, engineering, medical, and educational and human development, and in cooperation with related parties in the University. In addition, this Division will promote disaster mitigation research with seven visiting professors invited from leading research institutions. Disaster Mitigation Research Center will strengthen cooperation with Disaster Management Office to help make our research results conducive to the improved disaster prevention capability of Nagoya University. Your cooperation will be appreciated in our efforts to realize disaster mitigation society. April 2012

Mission of Disaster Mitigation Research Center

Director of the Center
Nobu Fukuda

Organization Chart of Disaster Mitigation Research Center

Disaster Management Office, Nagoya University

Disaster Management Office was established in October 2002 with the aim of developing a disaster prevention system inside the University and improving the regional disaster prevention capability. While driving disaster prevention efforts in the University such as earthquake disaster drills or disaster information system development, the Office has been developing practical research and social activities in the areas of expertise across academics, sociology and natural science, in collaboration with on-campus and outside researchers including those in Graduate School of Environmental Studies and citizens in the region. In particular, the Office set up and operates a regional disaster prevention networking hall and a disaster archive as its headquarters for those individuals conscious of getting involved in disaster prevention. Knowing about them through Disaster Prevention Academy and Nagoya Anna Earthquake Disaster Prevention Study Group, a number of ordinary users and experts are visiting the facilities. In addition, the Office has been focusing on the development and expansion of on-campus disaster-related information, such as earthquake early warnings, safety confirmation systems, and weather information, and preparation of educational materials for enhanced awareness of disaster prevention.

With the start-up of Disaster Mitigation Research Center, Disaster Management Office decided to put more emphasis in and after FY2011 on the construction of on-campus disaster prevention systems than it had done before. The Great East Japan Earthquake occurred at the very same time, pressing for the review and improvement of the University’s existing disaster prevention capability. Disaster Management Office is committed to continue on-campus disaster prevention efforts in close cooperation with Disaster Mitigation Research Center.

Members of Disaster Management Office:
Rai Tobi; Hifumi Karubata; Naka Inayoshi

Earthquake Disaster Orrl at Nagoya University

Regional Cooperation
Promote framework building that helps implement regional cooperation. Interface research results through “invisible” regional networks.

International Cooperation
Transfer the best practice of regional disaster mitigation strategy models to overseas countries, so that such disaster mitigation strategies will develop in Asia.

Expert Development
Realize human resource development projects strategically for disaster prevention policies and education and human resource development through regional cooperation.

Build disaster mitigation models through interdisciplinary cooperation. Realize a safe and secure society through regional collaboration.

Creation of “Intelligence” for Disaster Mitigation

Resonate interdisciplinary cooperative research and human resource development projects strategically for disaster prevention policies and education and human resource development through regional cooperation.
Research Projects to Realize Disaster Mitigation

To build disaster mitigation strategies for region-specific, large-scale disasters, Disaster Mitigation Research Center will pursue academic projects aiming at "Prediction of Great Natural Disasters to Hit the Tokai Area and Realization of Safe and Secure Communities by Comprehensive Disaster Mitigation Measures." This initiative will allow Disaster Mitigation Research Center to achieve the following goals through cooperation between different fields, industry-academic-government sectors, regions, and universities: (1) Preparation of disaster mitigation scenarios for great earthquakes along the Nankai Trough; (2) High-accuracy hazard and damage predictions of great earthquakes along the Nankai Trough; (3) High-accuracy hazard and damage predictions of Super Isewan Typhoon; (4) Development/sophistication of next-generation monitoring methodologies; (5) Social consensus on optimum disaster prevention standards.

Education Program Development for Disaster Prevention Experts

Training programs to cultivate disaster prevention experts (tentatively named): In December 2010, "Committee on What Should Be Done to Cultivate Disaster Prevention Experts" was set up by volunteers representing group members of "Aichi Disaster Prevention Cooperation Society Promotion Council," reviewing education programs for disaster prevention experts. In December 2011, the Committee worked out a new draft plan for (tentatively named) "Education Training for Disaster Prevention Experts," which is scheduled to start in FY2012 as a model project. Disaster Mitigation Research Center has proactively participated in this project, and will continue to do so in the future.

Lectures for students: Teachers involved in Disaster Mitigation Research Center offer classes of "Be Ready for Imminent Earthquake Disasters" for liberal arts students, and "Comprehensive Disaster Prevention Theory I-II" for postgraduates. In cooperation with Japan Bousai Organization, Disaster Mitigation Research Center provides a framework in which students who took classes of "Comprehensive Disaster Prevention Theory I-II" are granted qualifications of candidacy for disaster prevention experts.

Workshops for mass media: In the Tokai area, in preparation for large-scale disasters caused by large earthquakes and other natural hazards, members from mass media, researchers, administrative agencies, NPOs, and infrastructure companies (operating mainly in the area) started NSL (Network for Saving Lives) in 2001 for the purpose of exchanging their opinions and information. Teachers involved in Disaster Mitigation Research Center proactively participate in the NSL workshops.

Holding Disaster Prevention Academies

Disaster Mitigation Research Center holds a lecture related to disaster prevention every month for citizen groups and ordinary citizens who support disaster prevention activities. These lectures had been held 67 times before FY2010. Lastly, as many as 100 participants come to receive a lecture each time. In FY2011, there was a lecture that featured the Great East Japan Earthquake.

Mega-Disaster Information Center (MeDIC)

On March 14, 2011, the following week after the Great East Japan Earthquake occurred, an information center that would collect data about the mega earthquake was set up at Disaster Mitigation Research Center. MeDIC has collected and distributed information about the mega earthquake as much as possible, including newspapers, magazines, press releases from various organizations, videos, and photos. Various types of people, such as ordinary citizens, students (including foreign students), media, businesses, and researchers, have visited MeDIC, with the total number of visitors exceeding 1,000. MeDIC was temporarily closed at the end of March 2012. However, our plan is to reopen the center as a spot to share the information about possible great earthquakes along the Nankai Trough that may hit this region in the near future, and the update on other earthquake disaster prevention activities.

Holding Gen Science Cafés

Gen Science Café is an event where teachers in their respective areas of expertise respond, through talks with an MC, to questions from ordinary citizens about a number of phenomena relating to natural disasters in a comprehensive way. With teachers involved in the Center serving as lecturers (guests) and MCs, Cafés are held at a pace of once a month mainly on the theme of the Great East Japan Earthquake. The total number of Cafés that had been held before March 2012 was 10. The short distance between the MC (guests) and audience, and the horizontal line of sight, encourage participants to make more comments and ask more questions than they would in typical meetings of this kind. The Center will continue to hold Gen Science Cafes on new themes.

Holding Symposia and Other Events

In and after December 2010, Disaster Mitigation Research Center has organized, held, and participated in many symposia as listed below:

- March 26, 2011: Great Earthquake Memorial Symposium by Disaster Mitigation Research Center, "How Should We Do with Looming Great Earthquakes?"
- June 11, 2011: Symposium on the Earthquake Disasters, Nagoya University, "Lessons Learned from the Great East Japan Earthquake"
- September 3, 2011: Symposium on Disaster Prevention and Mitigation, Nagoya University, Japanese Red Cross Society and Asahi Shimbun, "Disaster Medical Care and Regional Cooperation Learned from the Great East Japan Earthquake"
- October 28, 2011: Symposium on Disaster Prevention and the Rebirth of Japan "120 Years since the Great Nobi Earthquake - Looking Back the Lessons Learned"
Introduction of Endowed Research Divisions

In April 2012, Disaster Mitigation Research Center set up three new endowed research divisions: Research Division on Disaster Precautions in the Energy Supply Area (Chubu Electric Power Company), Disaster Precautions in the Soil and Lifelines Area (Toho Gas), and Research Division on Disaster Mitigation Planning for Regional Communities (OYO Corporation) Endowed Research Division. This section provides a summary of the work being pursued by these research divisions.

Research Division on Disaster Precautions in the Energy Supply Area (Chubu Electric Power Company)

This research division is working on the following research themes to improve regional disaster prevention capabilities through stable and safe energy supply:

1. More accurate estimates of magnitude of seismic ground motions and tsunami caused by great earthquakes along the Nankai Trough.
2. More accurate estimates of damage at energy supply facilities in the event of great earthquakes along the Nankai Trough.
3. Study on preventive and early recovery measures that keep energy supply facilities functional in the wake of disasters Great earthquakes along the Nankai Trough have occurred repeatedly at intervals of 100–150 years. Therefore, more accurate estimates of damage caused by seismic ground motions and tsunami would require estimation of the extent of damage in past earthquakes based on the investigation of the historical documents. To avoid unexpected circumstances as seen in the Great East Japan Earthquake, it is necessary to estimate accurate damage and measures for every possible contingency. Taking fully into account the practical capability of energy supply, and the viewpoint of users and regional communities as well, this research division will study measures to improve disaster prevention capabilities in the energy supply. In parallel with these efforts, this research division will develop experts, who lead future disaster mitigation research and education, through day-to-day research activities, and pursue cooperative activities in industry-government-private-sector and information distribution for regional communities.

Research Division on Disaster Precautions in the Soil and Lifelines Area (Toho Gas)

This endowed research division will conduct adequate verification of ground failures and disaster-related factors in the wake of the Great East Japan Earthquake, with particular emphasis on gas supply networks. At the same time, the research division will pursue the following research themes to help mitigate future seismic damage by making the best of the latest knowledge, such as seismology, civil engineering, geotechnical engineering, and architectural design:

1. Assessment of earthquake resistance of underground utilities, such as pipelines, and aboveground structures, based on the structural characteristics of the region:
2. Accurate assessments of ground deformation and liquefaction and lifelines damage caused by great earthquakes:
3. More sophisticated prediction methodologies for underground pipeline damage caused by great earthquakes:
4. Application of more sophisticated ground models based on the analysis of ground and geographical information in the Tokai regional communities that will help prevent and mitigate earthquakes and complex disasters particularly in the Tokai area.

Research Division on Disaster Mitigation Planning for Regional Communities (OYO Corporation) Endowed Research Division

Based on the ongoing scientific approach focused on geophysics and engineering, as civil engineering and geotechnology, this endowed research division will pursue the following research themes, with the aim of creating disaster mitigation plans for regional communities that will help prevent and mitigate earthquakes and complex disasters particularly in the Tokai area:

1. More sophisticated ground models based on the analysis of ground and geographical information in the Tokai area:
2. More sophisticated predictive assessment methodologies for earthquake and tsunami damage:
3. Development and application of predictive assessment methodologies for economic damages:
4. Building effective and efficient disaster mitigation measures, applying them to city planning, and assessing their effectiveness and appropriateness:

Through a series of research activities to promote disaster management in regional communities, this research division will contribute to the education and development of experts who will lead future disaster mitigation research and education efforts.

Disaster Precautions in the Soil and Lifelines Area(In collaboration with Toho Gas)

Introduction of Endowed Research Divisions

For 31 years at a private company where earthquake-resistant structures were designed, I have been single-mindedly studying earthquakes and disaster prevention, thoroughly investigating not only Japan but also overseas, and have realized my goal of developing new science for disaster prevention in the history of our country. After the investigation, I kindly realized that though an earthquake is a natural disaster, it is not a natural disaster, but a man-made one. The way in which we build our building and the way we use it is important to how we mitigate it. What it takes to mitigate disasters, therefore, is cooperation across many research fields, ranging from earthquake science to human communication science. I believe it is more important than cooperation between scientists and engineers, and the present research will be leading role in disaster mitigation activities. Taking a larger view of our mission, I am committed to live up to the name of Disaster Mitigation Research Center.

I have been involved mainly in the areas of thermal power source development and field activities related to prevention. I also work in the fields of energy and environment, as well as in the fields of environmental and social science. I have worked to develop natural disasters of the modern Japanese society supported by sophisticated lifelines. I have been investigating the human society in which energy-related disaster prevention, such as that for radiation, is crucial. I am conducting research on the role of energy-related disaster prevention through stable and safe energy supply.

In the wake of an earthquake or other disasters, if it takes time to restore a city’s energy supply, it will be very difficult to keep the city in order, and the subsequent reconstruction might be hampered. Leveraging my hands-on experience at an energy company, I am going to fulfill my roles together with my members of this research center so that we can work in a safe and stable manner even during disasters. Through these efforts, I am committed to contribute to mitigation of and early restoration from disasters in the region. I will appreciate your support.

The Great East Japan Earthquake on March 11, 2011, gave a historic great earthquake disaster. That event reinforced regional communities, had unprecedented damage to Tokai district of daily lives, families, and workplaces in a manner. The Tymphoons No. 12 and No. 13 gave the extensive damage to Chubu region as well on September 7, 2011. To achieve sustainable growth of the Japanese economy, strengthening the response capability to and resilience from natural and complex disasters is an urgent challenge. The Great East Japan Earthquake had a significant impact on many energy-related areas. In the future, it is predicted that more and more severe and severe great earthquakes along the Nankai Trough, it is sure that the mutual assistance among the communities including the Tokai region is important and effective. I will contribute to the realization of disaster prevention and mitigation in regional communities, our livability, to the best of my ability.
I have been studying geology, a natural phenomenon that is occurring in an active process. I have been involved in the study of discussive crustal movements in the vicinity of the Great East Japan Earthquake. I regretted much, however, that our research results had not been applied to prevent that particular disaster. Such a bad memory in mind encourages me to contribute to the further development of more accurate, geology-based analyses of past earthquakes and tsunamis.

Although I have passed the year when the Great East Japan Earthquake occurred, there is a way to go in the preparation of future disasters. I am a true expert who is supported by the two Director-General of Tsukuba Research Center and has a few dozens of researchers in the field of disaster prevention. I have been involved in the development of a number of disaster mitigation projects and contributed to the development of seismic hazard maps that are useful for the management of soft grounds and the prediction of seismic behaviors. My research in this field has led to the development of an advanced diagnostic system for earthquake-resistant buildings.

I am engaged in ongoing disaster prevention and improvement-related research and tasks in Ministry of Construction and Land, Infrastructures and Transportation. During my temporary assignment at Nippon Steel Corporation in 2008, I engaged in the safe policy for earthquake-resistant buildings. I have been engaged in research and activities that contribute to the center’s success.

I was heavily shocked at the news of the Tohoku area being devastated by the Great East Japan Earthquake and Tsunami. The tsunami disaster claimed the lives of many people, but at the same time, many people evacuated to save their lives. We must learn from this experience and improve our disaster prevention measures. In the future, we should focus on the development of effective evacuation plans and the improvement of community resilience.

I am studying urban disaster prevention, particularly on measures for megacities. In the event of a disaster, urban areas are particularly vulnerable to the impact of ground movements. Studies of the dynamic behavior of ground movements are important for urban areas in Japan, which are characterized by seismic hazard. I have been involved in the study of ground movements and their impact on urban areas. This research contributes to the better understanding of ground movements and the development of effective disaster prevention measures.

After finishing my graduate school and working at a construction company’s technology research institute for 15 years, I had been studying seismic ground movement development in cities and urban areas. As a result, I contributed to the development of a temporary assignment at the Headquarters for Earthquake Research Promotion. My work at the Center for Advanced Science & Technology, Nagoya University to engage myself in experiments and observational studies such as seismic hazard in Japan. I have been working on strong ground motion and seismic damage predications, which increases my engagement in disaster prevention related research. I am researching on the development of new disaster mitigation systems and technologies that can be applied to urban areas in Japan.

I am involved in the development and application of analysis codes to better understand the dynamic behavior of ground movements in urban areas. As an example, in the wake of the Great East Japan Earthquake, I have been working on strong ground motion and seismic damage predications, which increases my engagement in disaster prevention related research. I am researching on the development of new disaster mitigation systems and technologies that can be applied to urban areas in Japan.
Introduction of Members (Concurrent Professors)

Hirokazu Kato
Position: Department of Civil Engineering, Graduate School of Engineering
Specialty area: Coastal Engineering
Hirokazu Kato has been engaged in research on coastal engineering and structural mechanics. His recent work includes the study of wave-induced forces on coastal structures and the development of numerical methods for predicting tsunami run-up and overtopping on coastal defenses.

Kazuhisa Tsunekawa
Position: Department of Civil Engineering, Graduate School of Engineering
Specialty area: Structural engineering
Kazuhisa Tsunekawa specializes in structural engineering and earthquake-resistant design. His research focuses on the seismic behavior of structures and the development of new materials for earthquake-resistant construction.

Mariko Matsumoto
Position: Department of Civil Engineering, Graduate School of Engineering
Specialty area: Structural engineering
Mariko Matsumoto is an expert in structural engineering and earthquake-resistant design. Her research interests include the seismic behavior of structures and the development of new materials for earthquake-resistant construction.

Akito Murayama
Position: Disaster Management Office, Graduate School of Environmental Studies
Specialty area: Disaster prevention
Akito Murayama is engaged in disaster management and emergency response planning. His research focuses on the development of strategies and systems for effective disaster prevention and management in coastal regions.

Hisashi Komatsu
Position: Department of Psychology and Human Development, Graduate School of Education and Human Development
Specialty area: Clinical psychology
Hisashi Komatsu is an expert in clinical psychology and the assessment and treatment of mental health issues. His research focuses on the role of psychological factors in disaster mitigation and the emotional well-being of disaster survivors.

Yasuo Kitane
Position: Department of Civil Engineering, Graduate School of Engineering
Specialty area: Geotechnical engineering
Yasuo Kitane specializes in geotechnical engineering and earthquake-resistant design. His research interests include the behavior of soils and foundations during earthquakes and the development of new materials for earthquake-resistant construction.

Ryo Otsuka
Position: Department of Civil Engineering, Graduate School of Engineering
Specialty area: Geotechnical engineering
Ryo Otsuka is an expert in geotechnical engineering and earthquake-resistant design. His research focuses on the behavior of soils and foundations during earthquakes and the development of new materials for earthquake-resistant construction.

Tetsu Takei
Position: Department of Civil Engineering, Graduate School of Engineering
Specialty area: Geotechnical engineering
Tetsu Takei specializes in geotechnical engineering and earthquake-resistant design. His research interests include the behavior of soils and foundations during earthquakes and the development of new materials for earthquake-resistant construction.

Takanori Ishii
Position: Department of Civil Engineering, Graduate School of Engineering
Specialty area: Geotechnical engineering
Takanori Ishii is an expert in geotechnical engineering and earthquake-resistant design. His research focuses on the behavior of soils and foundations during earthquakes and the development of new materials for earthquake-resistant construction.

Naoyuki Matsuda
Position: Department of Civil Engineering, Graduate School of Engineering
Specialty area: Structural engineering
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